



AGENDA

- **Soldier C4I Today and in the future**
- **Context – Key *use case* example**
- **Constraints and Limitations**
- **Vision and Future Capability Requirements:**
 - **Communication, Navigation and Integration**
 - **Sensors**
 - **Information Management**
- **Questions**

SOLDIER C4I TODAY

- **Current items**



Night Vision Goggles
Laser Aiming Systems
Thermal Binoculars and Weapon Sights
Communication on **Voice** only at Soldier level

- **Personal Role Radios** (Comm at section/platoon level)
- **Radio** PRC-522/148/152 (Secure Comd for pl/coy/BG, etc)

Handheld Global Positioning System (GPS)
(still using map and compass/ Lose SA when out vehicle)

- **Weight issue** (add on equipments)
 - More Capabilities = more devises = more batteries = Increase the Weight/Volume
- **Low integration** / Device place where space available

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CONCEPTUAL WEIGHT FIGHTING ORDER



- **Commander Weight:** 26.5 Kg / 57.54 Lbs
- **Rifleman Weight:** 25.4 Kg OR 55.93 Lbs
- **C9 LMG Weight:** 33.0 Kg OR 72.80 Lbs
- **Grenadier Weight:** 38.2 Kg OR 84.3 Lbs
- **C6 GPMG Weight:** 39.5 Kg OR 87.18 Lbs

* Without suppl ammunition, water, ration and other eqpt, much higher in operation.

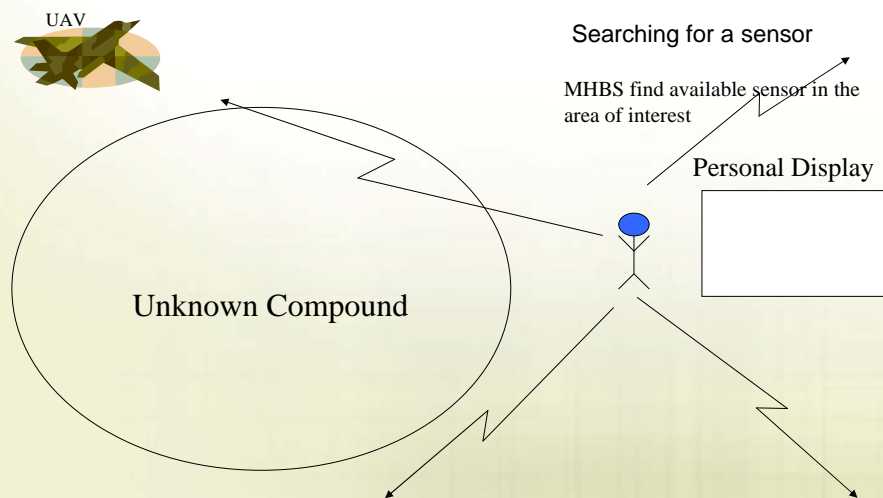
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SOLDIER C4I FUTURE

- **Integrated solution**
- **Modular Head Born System - Soldier Command and Control :**
 - Adjustable to the threat (Combat in CBRN environment to peace keeping ops)
 - Integrated BCID
 - Increase his visual and audition capabilities (Augmented reality, ability to zoom in/out, etc.)
 - Personal Weapon Sight integrated to the MHBS.
 - Low weight
 - Day/ Night /All environmental condition operation
 - Ability to control sensors at the same time (UAV, UGV, etc.)
- **Weapon**
 - Ability to change ammunition type
 - Automatically adjustable
 - Ability to control other assets (Line of sight weapon, Air, Arty, etc.)

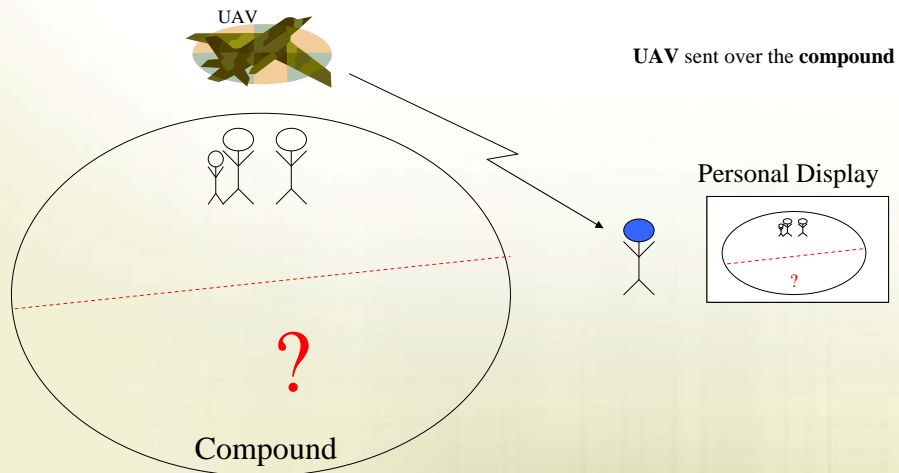
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Vision and Future Capability Requirements Use Case

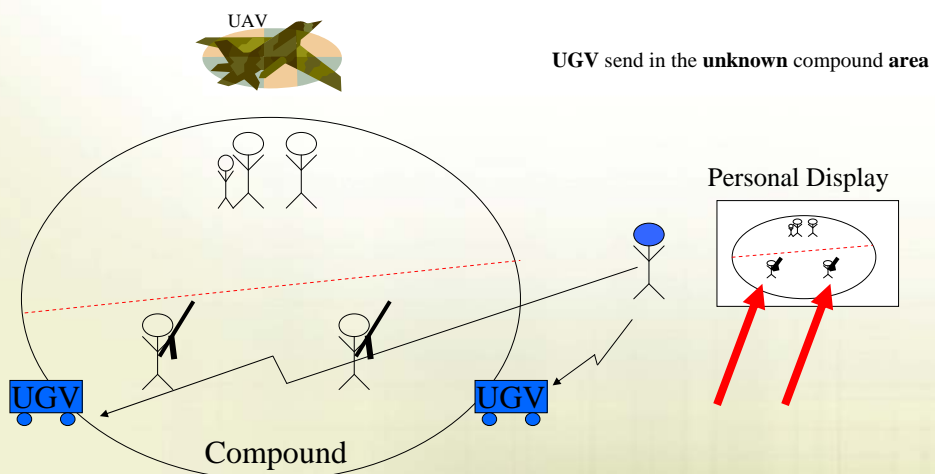


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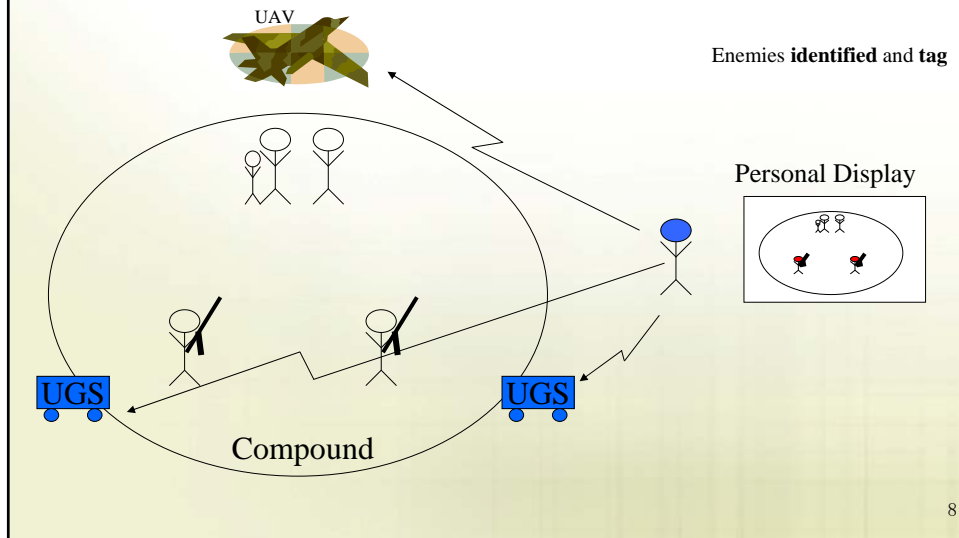
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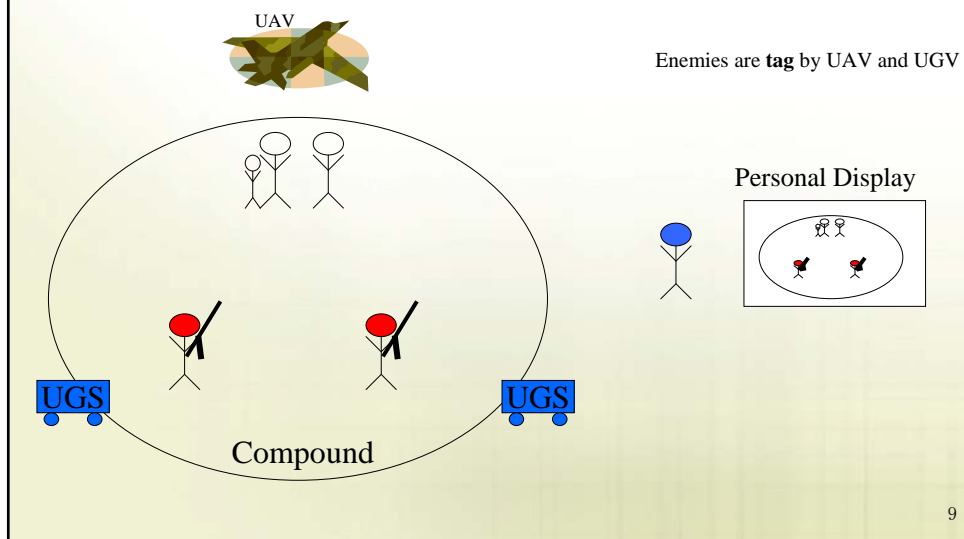
Vision and Future Capability Requirements Use Case



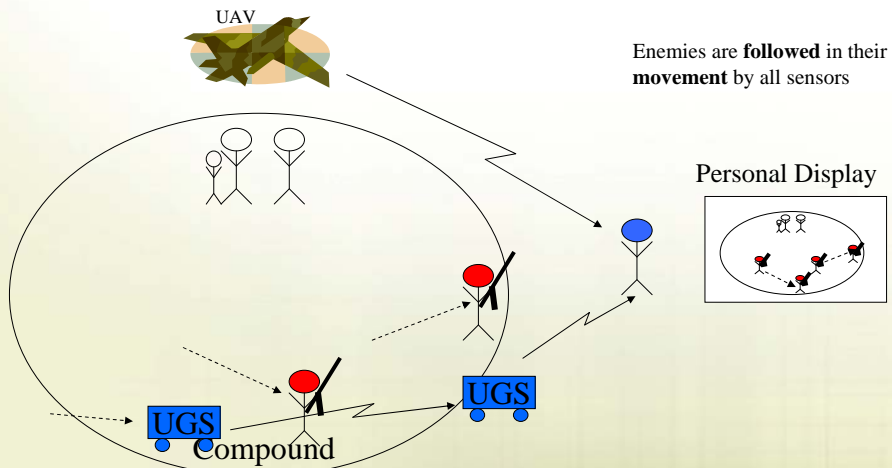
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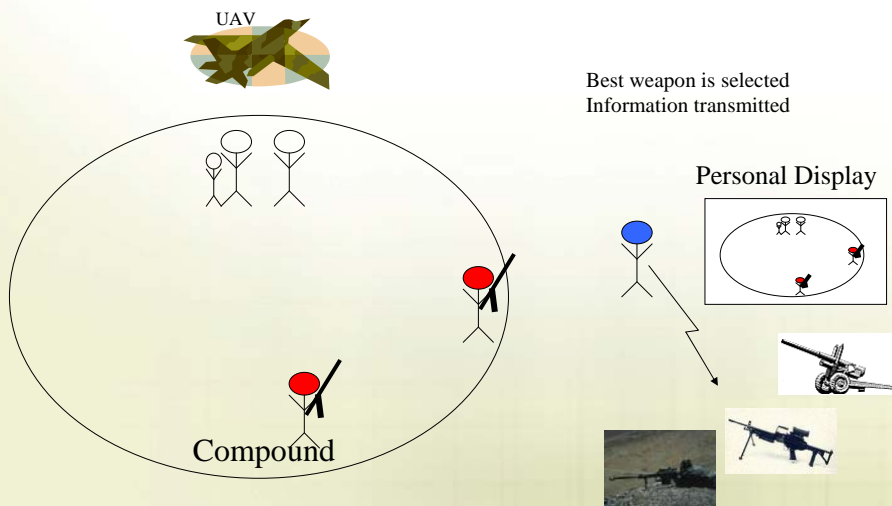


Vision and Future Capability Requirements Use Case



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Vision and Future Capability Requirements Use Case

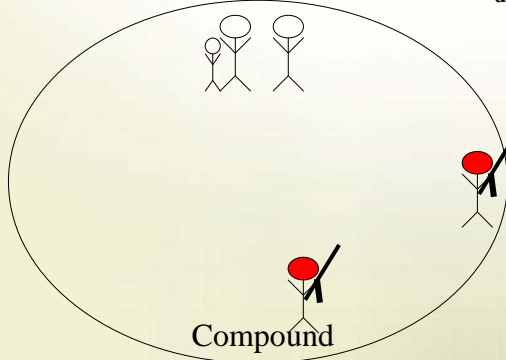


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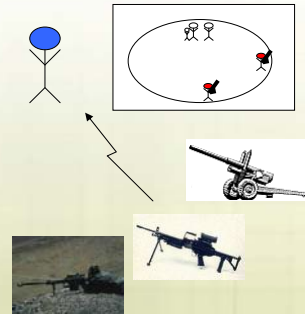
Vision and Future Capability Requirements Use Case



- Tag enemies are followed in their movement.
- Acknowledgement sent from weapon and details of the engagement provided



Personal Display

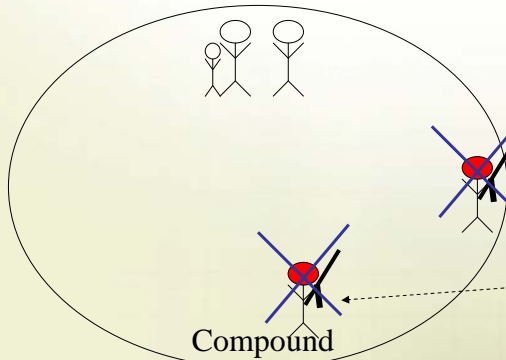


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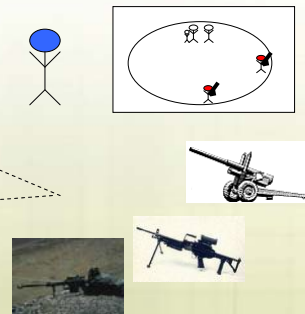
Vision and Future Capability Requirements Use Case



Enemies engaged !!

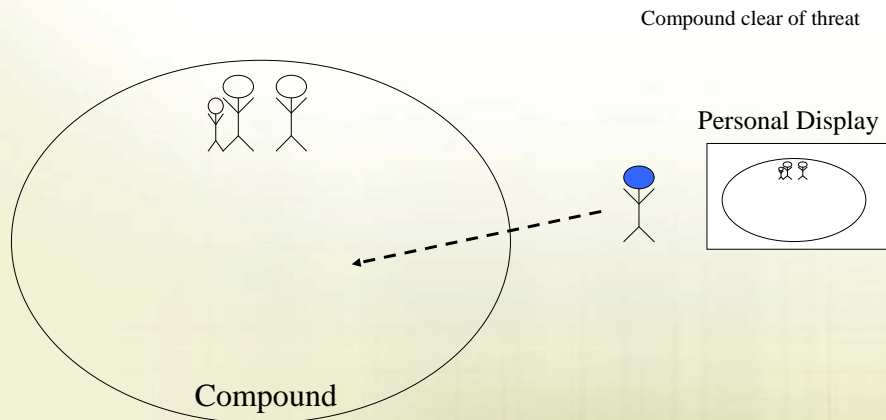


Personal Display



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Vision and Future Capability Requirements Use Case



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CONSTRAINTS AND LIMITATIONS

- **Weight (Miniaturization of C4ISR related technology)**
- **Volume (miniaturization of C4ISR related technology)**
- **Power consumption**
- **Information overload**
- **Policy (frequency spectrum allocation, security policies)**
- **Programmatic realities – Integration issues highly depend on coordination between many capital projects**
- **Absence of “commercial infrastructure”**
- **\$\$\$**

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Vision and Future Capability Requirements

Geo-location capability

- **Improved performance of geo-location capability:**
 - Friendly forces and assets (moving sensors)
 - Enemy forces
- **Where are my buddies now**
- **Where is the enemy now**
- **Current limitation**
- **Integrated Blue Force Tracking (BFT) and Battlefield Combat Identification (BCDI) ?**

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Vision and Future Capability Requirements

Communication

- **Communication capability**
 - High Throughput for rich services
 - Coverage in different environment
 - Operation in Canada and abroad (licensing)
 - Adaptable Waveform (Performance optimized for environment and mission)
 - Connectivity with higher echelon services and sensors
 - RF unfriendly environment – new communication technologies such as magnetic induction

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Wireless Soldier?

PDA

- Touch screen
- GPS
- RFID reader
- GPRS/ UMTS
- IR camera
- Wireless RF
- Micro radar
- IR camera
- Teleweapon
- Encrypted data

**Event driven info
NEC network**

Body area network

Weapon

- RFID tag
- IR camera

Electronic BC shoe nose

Helmet

- GPS
- 360° camera
- Visor display (incl. teleweapon)

Wireless earplug

- Audio info
- Temperature-sensor

Watch

- ID
- GPS
- Time
- Telephone
- Heart rate
- Wireless RF
- Position/ motion
- Acc gyro
- Drug delivery
- Condition
 - Hydration
 - Glucose
 - Lactate
 - Medical status

Ammo cartridge with RFID

Sensor nodes

- Acoustic
- Chemical/ bio
- IR
- Radar
- Camera
- RF switches mines
- Target recognition

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Vision and Future Capability Requirements Sensors

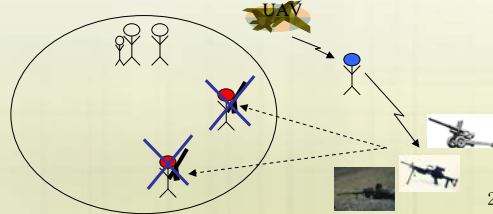
- **“Soldier feed” from the “network” - Seamless connectivity with higher infrastructure sensors**
- **Threat detection**
- **Physiological sensors?**
- **Disposable micro/nano UGS and UAVs**
- **Look through wall sensors**
- **Precise human target detection, recognition, identification and tracking capability**
- **Sensors and effectors Integration:**
 - Sensor remote control and interrogation
 - Weapon Remote control
 - Soldier as a sensor

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Vision and Future Capability Requirements

Integration with higher infrastructure and platforms

- Soldier's C4ISR capability between mounted state and dismounted state should be almost transparent and transition should be "smooth".
- Voice and data services should be provided and controlled from the same input and output devices:
- Security solution transparent to user
- Fully enabled JIMP (Joint, Inter-agency, Multi-national and Public) Capability
- Sensors and effectors Integration – target handoff



Vision and Future Capability Requirements

Information Management

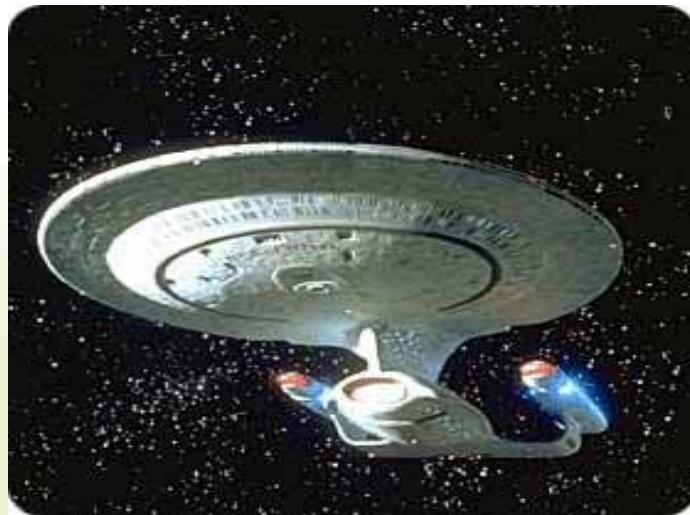
- Appropriate information presented to dismounted soldier and commander
 - What information he needs to do his job
 - "context-based" information (mission based/task based)
 - avoid information overload
 - Pre-processed/"Fused" information
- Decision aid tools in order to
 - support situation analysis
 - achieve situation awareness faster
 - Provide options to do better informed decision

Manual / Human-Only Systems?



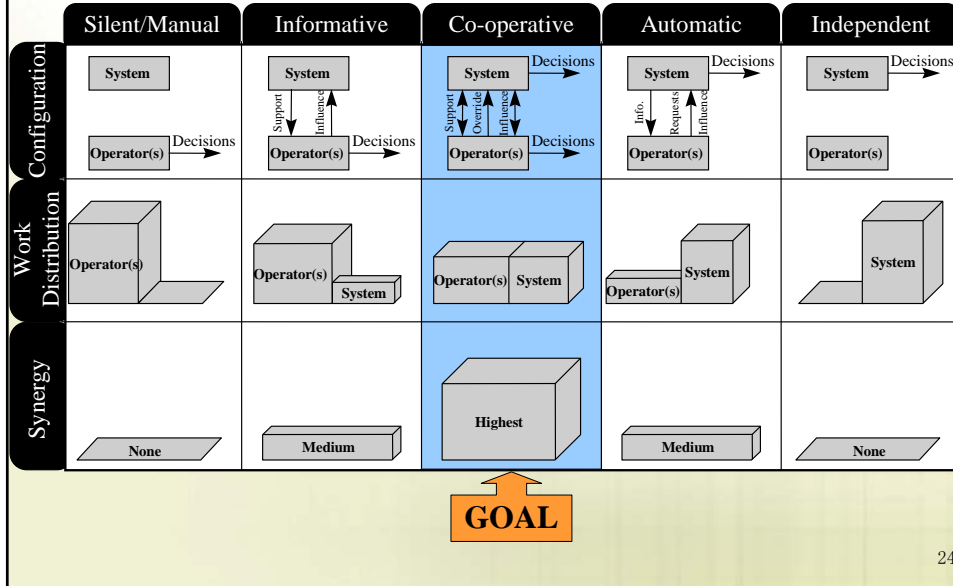
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Automatic / Independent Systems?



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Spectrum of Human-Computer Interactions



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Questions?



For more information, please consult:
<http://soldiersystems-systemesdusoldat.collaboration.gc.ca>

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